

Appl. No. 09/653,157

### REMARKS

Claims 1, 7, 12 and 25 are amended. Claims 1-35 are pending in the application.

Claims 1 and 7 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor had possession of the claimed invention. The Examiner states that the recited "feeding a single feed gas" is not described in the specification. The Examiner states that the specification describes "at least two feeding gases, oxygen and nitrogen". The Examiner further states that a feed gas cannot be a "single" feed gas when the feed gas comprises 99.999% oxygen since there must be another 0.001% of other gases. The claim language at issue was discussed at an Examiner interview conducted April 23, 2002 which did not yield an agreement concerning the subject claim language. Without admission as to the propriety of the Examiner's rejection, applicant has amended claim 1 and claim 7 to remove the word "single" from the recitation. Accordingly, applicant respectfully requests withdrawal of the § 112, first paragraph rejection of claims 1 and 7 in the Examiner's next action.

Claims 1 and 7 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner states that the recited "feeding a single feed gas comprising at least 99.999% O<sub>2</sub>" is

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vague and indefinite. As discussed above, claims 1 and 7 are amended to no longer recite the word "single" with respect to the feed gas and the § 112, second paragraph, rejection is rendered moot. Accordingly, applicant respectfully requests withdrawal of the § 112, second paragraph, rejection of claims 1 and 7 in the Examiner's next action.

Claims 1, 4, 7 and 9 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Harada et al., U.S. Patent No. 5,631,868. As amended, independent claim 1 recites providing a feed gas comprising at least 99.999% O<sub>2</sub>, by volume, and in the absence of additionally added gases, feeding the feed gas through an ozone generator to generate ozone from the feed gas. The amendment to claim 1 is supported by the specification at, for example, page 4, line 14 through page 5, line 10 which discloses feed gas composition and purity as well as the benefits imparted by the disclosed compositions and purity. Harada discloses a feed gas consisting of oxygen gas supplemented with nitrogen gas to supply an ozone generator (col 3, Ins 44-50), a feed gas consisting of oxygen supplemented with carbon dioxide or carbon monoxide (col 6, Ins 32-35 and Fig. 5) and a feed gas which is a mixture of oxygen gas having a purity of at least 99.999% and at least one gas selected from nitrogen, carbon dioxide and carbon monoxide (col 7, Ins 38-45). Harada fails to teach or suggest the claim 1 recited providing a feed gas comprising at least 99.999% O<sub>2</sub>, by volume, and feeding the feed gas in an absence of additionally added gases through an ozone generator to generate ozone from the feed gas.

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Independent claim 1 is therefore not anticipated by Harada and is allowable over this reference.

Dependent claim 4 is allowable over Harada for at least the reason that it depends from allowable base claim 1.

With respect to claim 7, as amended such recites providing a feed gas comprising oxygen and less than or equal to 0.001% nitrogen by volume and feeding the feed gas through an ozone generator in an absence of additionally added gases. Independent claim 7 is allowable over Harada for at least reasons similar to those discussed above with respect to independent claim 1.

Dependent claim 9 is allowable over Harada for at least the reason that it depends from allowable base claim 7.

Claims 2-3, 5-6, 8 and 10-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Harada in view of one or more of Ury, U.S. Patent No. 4,885,047; De et al., JP 411219926A and Mullee, U.S. Patent No. 6,306,564. As discussed above, independent claims 1 and 7 are not rendered obvious by Harada. Not one of Ury, De or Mullee teach or suggest the claim 1 and claim 7 recited providing a feed gas comprising 99.999% oxygen or comprising oxygen and less than or equal to 0.001% nitrogen, by volume, and feeding the feed gas in an absence of additionally added gases through an ozone generator. The various cited combinations of Harada, Ury, De and Mullee fail to disclose or suggest the claim 1 and claim 7 recited providing a feed gas comprising 99.999% oxygen or oxygen and less than or equal to 0.001% nitrogen, by

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volume, and feeding the feed gas through an ozone generator in an absence of additionally added gases. Independent claims 1 and 7 are therefore not rendered obvious over Harada, Ury, De and Mullee, individually or as combined, and are allowable over the cited combinations of references.

Dependent claims 2, 3, 5, 6, 8, 10 and 11 are allowable over the various combinations of Harada, Ury, De and Mullee for at least the reason that they depend from corresponding base claims 1 and 7.

Claims 12-24 and 25-35 stand rejected under one or more of Mullee and Ury. As amended, independent claims 12 and 25 each recited providing a feed gas comprising oxygen and less than or equal to 0.001% nitrogen, by volume, feeding the feed gas through an ozone generator in an absence of additionally added gases and forming a mixture of ozone and organic solvent vapors in a reaction chamber. As discussed above, Mullee and Ury, either individually or as combined, fail to teach or suggest the recited providing a feed gas comprising oxygen and less than or equal to 0.001% nitrogen, by volume, and feeding the feed gas through an ozone generator in an absence of additionally added gases. Dependent claims 12 and 25 are therefore not rendered obvious by Mullee individually or as combined with Ury, and are allowable over these references.

Dependent claims 13-24 and 26-35 are allowable over Mullee and Ury, either individually or as combined, for at least the reason that they depend from corresponding allowable base claims 12 and 25.

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For the reasons discussed above, claims 1-35 are allowable. Accordingly, applicant respectfully requests formal allowance of claims 1-35 in the Examiner's next action.

Applicant notes the Examiner's indication during the Examiner interview of April 23, 2002, that the designation of Final Action status on the Office Action Summary mailed January 30, 2002 was inadvertent. Applicant acknowledges receipt on April 24, 2002 of the substitute Action Summary sheet indicating the non-final status of the Action. Applicant's response has been prepared accordingly.

Respectfully submitted,

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Inventor ..... Torek et al.  
Assignee ..... Micron Technology, Inc.  
Group Art Unit ..... 1765  
Examiner ..... Deo  
Attorney's Docket No. .... MI22-1376  
Title: Methods of Removing at Least Some of a Material From a Semiconductor Substrate

VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING  
RESPONSE TO JANUARY 30, 2002 OFFICE ACTION

In the Claims

The claims have been amended as follows. Underlines indicate insertions and strikeouts indicate deletions.

1. (Twice Amended) A method of removing at least some of a material from a semiconductor substrate, comprising:

providing a feed gas comprising at least 99.999% O<sub>2</sub> (by volume);  
in an absence of additionally added gases, feeding a single the feed gas  
through an ozone generator to generate ozone from the feed gas; ~~the feed gas~~  
~~comprising at least 99.999% O<sub>2</sub> (by volume);~~ and

contacting the ozone or a fragment of the ozone with a material on a semiconductor substrate to remove at least some of the material from the semiconductor substrate.

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7. (Amended) A method of removing at least some of a material from a semiconductor substrate, comprising:

providing a feed gas comprising O<sub>2</sub> and less than or equal to 0.001% N<sub>2</sub> (by volume);

in an absence of additionally added gases, feeding the a single feed gas through an ozone generator to generate ozone from the feed gas; the feed gas comprising O<sub>2</sub> and less than or equal to 0.001% N<sub>2</sub> (by volume); and

contacting the ozone or a fragment of the ozone with a material on a semiconductor substrate to remove at least some of the material from the semiconductor substrate.

12. (Amended) A method of removing at least some of a material from a semiconductor substrate, comprising:

providing a feed gas comprising O<sub>2</sub> and less than or equal to 0.001% N<sub>2</sub> (by volume);

in an absence of additionally added gases, feeding the feed gas through an ozone generator to generate ozone from the feed gas;

forming a mixture of ozone and organic solvent vapors in a reaction chamber; and

contacting at least some of the ozone and solvent vapors with a material on a semiconductor substrate to remove at least some of the material from the semiconductor substrate.

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25. (Amended) A method of removing at least some of a material from a semiconductor substrate, comprising:

providing a feed gas comprising O<sub>2</sub> and less than or equal to 0.001% N<sub>2</sub> (by volume);

in an absence of additionally added gases, feeding the feed gas through an ozone generator to generate ozone from the feed gas;

forming a mixture of ozone and organic solvent vapors in a reaction chamber;

irradiating at least some of the ozone with ultraviolet light to form ozone fragments from the ozone; and

contacting at least some of the ozone fragments and solvent vapors with a material on a semiconductor substrate to remove at least some of the material from the semiconductor substrate.

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